CLAIMS

[cl001] 1. A curing light comprising:

a wand adapted to be grasped by a human hand for use in positioning and manipulating the curing light,

an elongate heat sink with a proximal end and a distal end, said proximal end being proximate said wand, said elongate heat sink having a longitudinal axis,

a mounting platform located at said elongate heat sink distal end, said mounting platform being adapted to have a LED chip module,

an LED chip module mounted on said mounting platform, said LED chip module including

a primary heat sink, said primary heat sink having a smaller mass than said elongate heat sink,

a well on said primary heat sink for mounting an LED chip,

an LED chip mounted in said well,

a cover that provides protective covering for said LED chip and which permits light emitted by said LED chip to pass through it to provide usable light exiting from said light module, and

a light reflective cone installed at said elongate heat sink distal end, said light reflective cone including

a proximal side proximal to said LED chip module, said proximal side including a light inlet having a dimension "d",

a distal side distal to said LED chip module, said distal side including a light exit having a dimension "a" and an exterior dimension "e", where e > a and a >d,

an exterior surface, and

an interior surface, said interior surface being capable of reflecting light emitted by said LED chip module in order to create a light footprint of desired shape, dimension and density.

[cl002] 2. A curing light as recited in claim 1 wherein said light reflective cone interior surface includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt, chrome, metal, plating and plastic.

[cl003] 3. A curing light as recited in claim 1 wherein light emitted by said LED chip module is emitted at an angle of from about 30 degrees to about 150 degrees to said elongate heat sink longitudinal axis.

[cl004] 4. A curing light comprising:

an elongate heat sink with a proximal end and a distal end, said elongate heat sink having a longitudinal axis defined between said proximal end and said distal end,

a semiconductor chip module mounted at said elongate heat sink distal end, said semiconductor chip module including

a primary heat sink, said primary heat sink having a smaller mass than said elongate heat sink,

a well on said primary heat sink for mounting a semiconductor chip,

a semiconductor chip mounted in said well,

a cover that provides protective covering for said semiconductor chip and which permits light emitted by said semiconductor chip to pass through it to provide usable light exiting from said light module, and

a light reflective device installed at said elongate heat sink distal end, said light device cone including

a proximal side proximal to said semiconductor chip module, said proximal side including a light inlet having a dimension "d",

a distal side distal to said semiconductor chip module, said distal side including a light exit having a dimension "a" and an exterior dimension "e", where e > a and a >d,

an exterior surface, and

an interior surface, said interior surface being capable of reflecting light emitted by said semiconductor chip module in order to create a light footprint of desired shape, dimension and density.

[cl005] 5. A curing light as recited in claim 4 wherein said light reflective device interior surface includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt, chrome, metal, plating and plastic.

[cl006] 6. A curing light as recited in claim 4 wherein said semiconductor chip module includes at least one semiconductor chip selected from the group consisting of light emitting diode chips, laser chips, light emitting diode chip array, diode laser chips, diode laser chip array, surface emitting laser chips, edge emitting laser chips, and VCSEL chips.

[cl007] 7. A curing light as recited in claim 4 wherein light emitted by said semiconductor chip module is emitted at an angle of from about 30 degrees to about 150 degrees to said elongate heat sink longitudinal axis.

[cl008] 8. A curing light comprising:

a secondary heat sink capable of providing a heat dissipation function,

a primary heat sink configured for at least one semiconductor chip to be mounted thereon,

a semiconductor chip mounted on said primary heat sink,

a cover that provides protective covering for said semiconductor chip and which permits light emitted by said semiconductor chip to pass through it to provide usable light exiting from the curing light, and

a light reflective device installed on said primary heat sink, said light reflective device including

a proximal side proximal to said semiconductor chip, said proximal side including a light inlet having a dimension "d",

a distal side distal to said semiconductor chip, said distal side including a light exit having a dimension "a" and an exterior dimension "e", where e > a and a >d,

an exterior surface, and

an interior surface, said interior surface being capable of reflecting light emitted by said semiconductor chip module in order to create a light footprint of desired shape, dimension and density.

[cl009] 9. A curing light as recited in claim 8 wherein said light reflective device interior surface includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt, chrome, metal, plating and plastic.

[cl010] 10. A curing light as recited in claim 8 wherein said semiconductor chip module includes at least one semiconductor chip selected from the group consisting of light emitting diode chips, laser chips, light emitting diode chip array, diode laser chips, diode laser chip array, surface emitting laser chips, edge emitting laser chips, and VCSEL chips.

[cl011] 11. A curing light as recited in claim 8 wherein said cover is selected from the group consisting of windows and focus lenses.

[cl012] 12. A curing light comprising:

a heat sink capable of providing a heat dissipation function and configured to have at least one semiconductor chip to be directly mounted thereon,

at least one semiconductor chip capable of emitting light useful for curing composite materials directly mounted to said heat sink,

a light reflective device installed at said heat sink location, said light reflective device including

a proximal side proximal to said semiconductor chip, said proximal side including a light inlet having a dimension "d",

a distal side distal to said semiconductor chip, said distal side including a light exit having a dimension "a" and an exterior dimension "e", where e > a,

an exterior surface, and

an interior surface, said interior surface being capable of reflecting light emitted by said semiconductor chip in order to create a light footprint of desired shape, dimension and density.

[cl013] 13. A curing light as recited in claim 12 wherein a > d.

[cl014] 14. A curing light as recited in claim 12 wherein at least a portion of the internal geometry of the light reflective device is selected from the group consisting of conical, frusto-conical, cylindrical and parabolic.

[cl015] 15. A curing light as recited in claim 12 wherein the dimensions of the light reflective device are as follow: a = from about 5 mm to about 8 mm; d = from about 4 mm to about 6 mm; and e = from about 8 mm to about 10 mm.

[cl016] 16. A curing light as recited in claim 12 wherein said light reflective device interior surface includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt, chrome, metal, plating and plastic.

[cl017] 17. A curing light as recited in claim 12 wherein said semiconductor chip is selected from the group consisting of light emitting diode chips, laser chips, light emitting diode chip array, diode laser chips, diode laser chip arrays, surface emitting laser chips, edge emitting laser chips, and VCSEL chips.

[cl018] 18. A curing light comprising:

a wand configured to be grasped and manipulated by a human hand,

controls on said wand for initiating and termination light transmission from the curing light,

control circuitry for controlling electrical power supplied to a light emitting semiconductor chip in the curing light,

a heat sink capable of providing a heat dissipation function and configured to have at least one semiconductor chip to be directly mounted thereon,

at least one semiconductor chip capable of emitting light useful for curing composite materials directly mounted to said heat sink,

a light reflective device installed at said heat sink location, said light reflective device including

a proximal side proximal to said semiconductor chip, said proximal side including a light inlet having a dimension "d",

a distal side distal to said semiconductor chip, said distal side including a light exit having a dimension "a" and an exterior dimension "e", where e > a,

an exterior surface,

an interior surface, said interior surface being capable of reflecting light emitted by said semiconductor chip in order to create a light footprint of desired shape, dimension and density, and

a cylindrical interior portion located on said interior surface, said cylindrical interior portion having a height of dimension "c" and a diameter of dimension "a", and.

[cl019] 19. A curing light as recited in claim 18 wherein a > d.

[cl020] 20. A curing light as recited in claim 18 wherein at least a portion of the internal geometry of the light reflective device is selected from the group consisting of conical, frusto-conical, cylindrical and parabolic.

[cl021] 21. A curing light as recited in claim 18 wherein the dimensions of the light reflective device are as follow: a = from about 5 mm to about 8 mm; c = from about 2 mm to about 3 mm; d = from about 4 mm to about 6 mm; and e = from about 8 mm to about 10 mm.

[cl022] 22. A curing light as recited in claim 18 wherein said light reflective device interior surface includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt, chrome, metal, plating and plastic.

[cl023] 23. A curing light as recited in claim 18 wherein said semiconductor chip is selected from the group consisting of light emitting diode chips, laser chips, light emitting diode chip array, diode laser chips, diode laser chip arrays, surface emitting laser chips, edge emitting laser chips, and VCSEL chips.